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GROUND WATER GUIDELINE

Ground water concerns include effects on ground water elevation, flow, and quality either upgradient, around, or downgradient of a mining operation. If proposed mining may approach or enter ground water, an appropriate evaluation of the ground water system must be performed, and an appropriate Plan Of Operation, including a ground water monitoring program, must be proposed.

PREMINE INFORMATION

Consult the Department to determine if any of the following need to be addressed:

1. Soils and Geology. This information may be obtained from public agencies, via test holes, or by drilling. Give the types and thicknesses of soil, overburden, and mine material, and the bedrock formation lithology (rock type) and name.

2. Hydrogeology. List information sources for all data (landowner, field data, Montana Bureau of Mines and Geology). Monitoring wells and time may be needed to gather some of this information. Give the following information only as needed for the situation under consideration: water bearing formation lithology and name; depth to ground water; thickness of saturation zone; direction of flow; gradient; mapped locations, ground elevations, static water levels from ground surface, uses, total depths from ground surface, and ownership of existing wells in and within at least 1,000 feet of the boundary of all planned excavations; aquifer transmissivity or hydraulic conductivity; and aquifer storativity.

3. Surface Hydrology. Give the locations, descriptions, and uses of surface water features in and within at least 1,000 feet of all proposed excavations.

The operator and the Department will use this information to determine potential ground water impacts and the suitability of the proposed Plan Of Operation.

GROUND WATER MONITORING

Consult the Department to determine if any of the following need to be addressed:

1. Ground Water Elevation Assessment:

a. For sites where permanent ground water drainage is not part of the reclamation plan, monitor seasonal ground water elevations to ensure that the reclaimed surface will be either 3 feet or more above the seasonal high ground water elevation for dryland reclamation or, unless otherwise approved, 3 feet or more below the seasonal low ground water elevation for pond reclamation.

b. Consult the Department about the number and locations of wells. A minimum of one well outside the pit area where it will not be affected by ground water drawdown, and, for dryland reclamation, one well established as soon as possible in a backfilled and graded, central portion of the pit, are required.

c. Establish a constant measurement point for each well (a point on top of the casing) and report water depths based on ground elevations (depth to water minus height of measurement point above ground). Monitor new wells 24-hours after establishment, monthly for the first 12 months, and quarterly thereafter (January, April, July, and October) to maintain a continuous record of hydrologic conditions, including variations effectuated by local land and water use changes.

d. Submit well data to the Department in a clear and consistent format immediately following each collection. Include a brief description of significant activities or changes (mining, reclamation, agricultural practices, subdivision, wells) on or adjacent to the site that may account for effects on ground water elevation.

e. Continue quarterly monitoring for one year after the completion of all backfilling, grading, and soil material replacement, then submit the final monitoring data and a brief report including a statement that the postmining ground water elevations are conducive to the postmining land use or a description of the remedial work needed to accomplish acceptable reclamation.

f. Request Department approval to abandon or transfer the wells (contact the State Board of Water Well Contractors for transfer procedures).

2. Ground water Damming or Dewatering Impact Assessment:

a. Monitor seasonal ground water elevations to ensure that ground water mounding due to impedance of ground water flow, or aquifer dewatering by pumping or free drainage, does not impact surface or ground water resources beyond the boundary of the property containing the mine site.

b. Consult with the Department about the number and locations of wells.

c. Establish a constant measurement point for each well (a point on top of the casing) and report water depths based on ground elevations (depth to water minus height of measurement point above ground). Monitor new wells 24-hours after establishment, monthly for the first 12 months, and quarterly thereafter (January, April, July, and October) to maintain a continuous record of hydrologic conditions, including variations effectuated by local land and water use changes.

d. Two weeks before the start of a dewatering or mining phase, monitor wells once a week. During a dewatering or mining phase, monitor wells on a weekly basis or upon every 100-foot highwall advance, whichever is most frequent. After completion of a dewatering or mining phase, monitor wells once a week for two weeks then resume the appropriate schedule given in 2(c).

e. Submit well data to the Department in a clear and consistent format immediately following each collection. Include a brief description of significant activities or changes (mining, reclamation, agricultural practices, subdivision, wells) on or adjacent to the site that may account for effects on ground water elevation.

f. If ground water elevations are found to be beyond the range of normal seasonal fluctuations, stop dewatering and cease mining in the direction of the affected area, inform the Department of the situation, and continue monitoring. The Department will quickly help determine an appropriate course of action.

g. Continue quarterly monitoring for one year after completion of mining and dewatering, then submit the final monitoring data and a brief report including a statement that the postmining ground water elevations are acceptable or a description of the remedial work needed to accomplish acceptable elevations.

h. Request Department approval to abandon or transfer the wells (contact the State Board of Water Well Contractors for transfer procedures).

WELL INSTALLATION AND ABANDONMENT

1. A monitoring well is any well that will be used to measure ground water quantity or quality. A licensed monitoring well constructor must be employed to install each well according to state requirements. The Department may require surveyed ground elevations at each well. Send a copy of each well log report and other pertinent information to the Department immediately after well completion.

2. A monitoring well no longer needed for its intended use, and not transferred to the landowner as a water well, must be abandoned in compliance with state requirements. Abandonment involves leaving the casing in place, grouting the hole from bottom up, cutting the casing off 3 feet below the ground surface, and backfilling the remainder of the hole with soil material.

3. Immediately after well abandonment or transfer, submit a well abandonment or transfer report to the Department.